In the 10 cases now studied, as in the 49 cases previously analyzed, the disease finished its course without any important complication or secondary affection. In none of the cases which I have collected was the disease associated with articular rheumatism or paraplegia, affections to which dysentery has been supposed sometimes to give rise.

To recapitulate the practical conclusions drawn from the study of ten hospital cases of sporadic dysentery, with reference to the natural history of the disease—

1st. The disease in a temperate latitude tends, without treatment, to recovery.

2d. It is a self-limited disease, and its duration is but little, if at all, abridged by methods of treatment now and heretofore in vogue.

3d. Convalescence is as rapid when active measures of treatment have not been employed, as in cases actively treated.

4th. Relapses do not occur in the cases in which the disease has been allowed to pursue its own course without active treatment.

5th. Sporadic dysentery, in a temperate climate, does not eventuate in a chronic form of the disease; in other words, it does not lead to ulceration or other lesions of the mucous membrane of the large intestine, and it does not involve any tendency to complications or secondary affections.

ART. III.—*Supra-pubic Lithotomy. An Attempt to ascertain its Merits and Practicability as a General Method; founded upon an Analysis of* 478 *Cases.* By CHARLES WINSLOW DULLES, M.D., one of the Resident Physicians at the Philadelphia Hospital.[1]

SUPRA-PUBIC LITHOTOMY, or "The High Operation," is assigned a very low place in most works upon Surgery, and is now so rarely practised that there are comparatively few medical men who have ever seen it done; indeed, it has surprised me, in my investigations, to find how little is known of it by men of no inconsiderable eminence in the profession.

---

[1] This paper is an abstract of a thesis, presented to the Medical Department of the University of Pennsylvania for the degree of Doctor of Medicine, which gained the Alumni Prize of $100. The whole comprises, beside what is found here, a history of the operation from its earliest use until the beginning of 1875, with a table of 478 cases, similar to that of the American operations which is now published.

The author desires to state that he is still engaged in the investigation of the subject, and intends to publish the entire results of his labours at a later day. Any information upon this method of lithotomy will be very gladly received and duly acknowledged.

And yet it is a subject worthy of very careful consideration, since the method seems so natural and simple—as indeed it is; and one may reasonably expect that it shall be judged by well-ascertained facts, and its value estimated by that due appreciation of its theoretical merits and practical results, whose combination alone can lead to a just decision in this, as in every other case.

Statistics alone cannot furnish the means of an accurate judgment, for there are many circumstances, affecting very materially the issues of any method, which can by no possibility be given a place in a table. Yet they do furnish the most convenient data upon which to found an opinion which will approach correctness in proportion as these theoretical considerations receive their due appreciation.

It would be impossible in this place to state all the circumstances connected with the operations collated by the author which have modified their results, nor can he expect that every reader will be disposed to attach as much importance to them, at his mention, as those who have read the full and graphic descriptions of the writers of the last three centuries. For the present it must suffice to mention some of the circumstances which have conduced to the current estimation of the value of this method, which every one of its few thorough investigators has been constrained to consider ill-founded. These circumstances being stated, we shall examine the actual results of the method as gathered from its statistics, bringing to this a proper appreciation of the preceding remarks; and, finally, we shall compare supra-pubic with perineal lithotomy in an abstract way, in the light of these two divisions of our study.

In the first place, a large majority of the operations by this mode occurred at a period when surgery in all its branches was but imperfectly developed; at a time when bleeding and purging were carried to extremes which later science condemns as eminently injurious; when anæsthetics were unknown; and when there were few of the modern facilities for the care of patients who have been subjected to so grave surgical injuries.

Again, the special methods used have often been in themselves harmful. Cheselden abandoned the operation, and records that it fell into disuse, because in a number of cases the bladders of patients were burst in attempting to distend them with what was deemed an indispensable quantity of fluid, and in others the peritoneum was cut and the intestines protruded at the wound,[1] alarming the operators and hindering them, while subjecting the patients to danger as great as it was unnecessary.

Some surgeons placed ligatures upon the penis to cause distension of the bladder by an accumulation of its contents, irritating the whole system of the patients and preparing a supply of diseased and poisonous urine to go pouring over the freshly cut vessels in the wound. Others placed large and rudely constructed catheters in sensitive urethræ and left them there until, in some cases, the patients could endure their presence no longer, and were provoked to intractability and violence which caused their death.

---

[1] Wm. Cheselden, "The Anatomy of the Human Body," 8vo., London, 1740, 5th ed.

Côsme[1] and Souberbielle,[2] who contribute nearly one-half of all recorded cases, made use of the perineal incision. Although it is specially mentioned in few of their cases, there can be little doubt that it was used in almost all. By this means tissues were incised which it is the special merit of the supra-pubic operation, when properly conducted, to avoid, and thus were added to the dangers already existing, many of those connected with perineal lithotomy.

Beside these, the supra-pubic operation has been, by all surgeons except Souberbielle, reserved as a "dernier ressort" for extreme cases, and such as were amenable to no other method. Even Souberbielle, its most earnest advocate in this century, used the lateral operation for very young patients, because they were so uncontrollable during the operation, which in his time was of course conducted without the use of anæsthetics. Others never resorted to this method except in very old cases, or those with strictured urethræ, or in cases of enormous calculi. In regard to these last it must be constantly borne in mind that they imply not simply the greater difficulty and danger of their extraction, but, also, what is of much more consequence, the constitutional disorders which affect those who have been long calculous. The importance of these considerations is recognized by almost all recent writers upon lithotomy, and the unfairness of comparing the death rates alone acknowledged.

As to the size and weight of some calculi removed by operation above the pubes, it is seen that Vitellius extracted one weighing ℥xxij;[3] Côsme, one of ℥xxiv ʒij;[4] Deguise, one of ℥xxxj;[5] and Uytterhoeven, one weighing over two pounds.[6] It is not surprising that these patients died. And yet, on the other hand, calculi just as large have been removed with success. Graefe relieved a patient of a calculus of ℥xxjss;[7] and Krimer one whose calculus weighed ℥xxiij;[8] this, too, after the perineal operation had been ineffectually practised the day before.

---

[1] J. Baseilhac, "Nouvelle méthode d'extraire la pierre par-dessus le pubis," 1 vol. 12mo., Paris, 1779.

[2] Mémoires de l'Académie, tome viii.

[3] Hildanus "Opera Omnia," Frankofurti ad Mænum, MDCXLVI, Cent iv. Obs. li.; also, Henry Earle, "Med. and Chirurg. Trans.," London, March 28, 1820, vol. xi. p. 69.

[4] Belmas, "Traité de la Cystotome sus-pubienne," 1 vol. 8vo., Paris, 1827, p. 147.

[5] Journal Gén. de Méd. An., vii. p. 423.

[6] Erichsen's Surgery, vol. ii. p. 705.

[7] Journal Gén. de Méd., tome lxxx. p. 246.

[8] Journ. von Graefe und Walther, Bd. x., 1827, p. 578.

This last complication is so grave that one must wonder that its occurrence could be followed by recovery. In a number of cases it has undoubtedly caused the death of the patient. Of those cited above, Côsme had vainly attempted the lateral operation two days before he did the supra-pubic; and Deguise, failing similarly, proceeded immediately to do the second operation, and *pried* the calculus out of his patient's bladder. In the case of Dr. Hodge, found in the table of American operations, it was only after the failure of protracted attempts that the supra-pubic operation was resorted to. Any one who has been a witness to the violent efforts a surgeon will use before relinquishing the hope of extracting a calculus by the method he adopts from choice and experience, need not be urged to appreciate how far such efforts should be held responsible for the death of a patient, and how little ought in fairness to be attributed to any other method which may be used subsequently.

Still, of 19 cases that we have collected, where this occurred, it will be seen that as many as 7 recovered. It was the observing and reflecting upon this which led so eminent a surgeon as Souberbielle to become the champion of the operation all his life long. For he thought a method which could succeed with so great obstacles to success, could not be in itself very perilous.

Finally, and by no means least important, is the consideration of the manner in which the supra-pubic operation has been neglected, in teaching and in practice It has at no time been adopted as a method of general utility. Cheselden, its most successful advocate in England, abandoned it very soon; not because it had failed in his hands, for of ten patients operated upon thus, he lost only one, and that from causes absolutely unconnected with the operation,[1] but because other surgeons had managed it so unskilfully as to kill their patients. And it has seemed to us, in examining this subject, that had Cheselden directed to the perfection of this method, which was truly scientific in its design and accomplishment, those talents which were so prolific of good results in the use of a method which owed its birth to a charlatan, the former would have been adopted even more readily than was the latter, and the whole course of lithotomy would have been very different. For at that time the ordinary methods were so very unsuccessful that all surgeons were prepared to try any which gave reasonable hope of better results. It seems to have been very unfortunate for supra-pubic lithotomy, that those accidents to which Cheselden refers, in explaining why he left it, should have occurred. Yet this surgeon, who did more than any other for the perfecting and establishing of lateral lithotomy, himself anticipated a time when the other might be practised with better chance of success. Notwithstanding which, the whole world turned at once to the new way, and incited by Cheselden's success, brought skill, and care, and emulation to bear upon its use, till it has attained a rank above all other methods.

---

[1] Wm. Cheselden, "A Treatise on the High Operation for the Stone." 1 vol. 8vo. London, 1723.

Far different has been the lot of the supra-pubic operation. Instead of receiving, as did its more fortunate rivals, the careful attention of generations of eminent surgeons, it has been treated with a disdain which must surprise any one who examines carefully the literature of this subject. For a glance over many works upon surgery would lead one to imagine it to be unworthy of serious consideration; and the part of wisdom to follow the lead of those who, instead of trying on it the effect of modern skill, and care, and intelligence, have been content to estimate and reject it from the imperfect statistics of the earliest times. We shall see elsewhere that those dangers which have been held up as constituting the most serious objections to its adoption have been very much exaggerated, and in this condition repeated from author to author almost without question.

As examples of the way in which the subject has been treated, and the summary way in which it has been dismissed, we cannot refrain from quoting a few authors.

Hildanus puts it pithily: "Cum dicto igitur Dn. Franco, fideli atque industrio cuivis chirurgo periculosæ hujus lithotomiæ administrationem iterum atque iterum dissuadeo." Upon which Cheselden makes this comment, "If he had seen the book (of Rossetus) he so freely criticizes, he would have found every one of his own objections there fairly stated and fully answered."

Dr. John Shaw, of Albany, in an article in the *Journal of Foreign Medicine*, Philadelphia, April, 1823, permits himself to make this ill-advised assertion: "We may sum up by saying that *all the accidents* which are generally assigned as the reason why patients die after the lateral operation, are *more apt* to take place after the high operation."

In Cooper's *Surgical Dictionary* (Am. ed. 1834), the statement is made that division of the peritoneum and protrusion of the viscera are "accidents which will be found, by any body who chooses to look over the cases on record, not to have been infrequent." A reference to the statistics we have gathered shows, that in 478 cases, only 13 times did this occur, and in only 3 did death follow. Still more, in only one of the fatal cases are we unable to find a sufficient explanation of the result without needing to charge it at all to the cutting of the peritoneum. So that it would appear that in only 1 case of 478 can we fairly charge the accident with causing the death of the patient.

Lizars, in his Surgery (1839), says: "Sir A. Cooper gives so horrible a picture of an operator in Paris wounding the peritoneum, and the intestines protruding, as to dissuade any one from adopting this operation." Had Lizars read some of the accounts of operations by the Apparatus

Magnus and the lateral method which occurred about his time, which were unspeakably more horrible than the one he refers to, he must have been very loath to operate for stone by any way. The account of a lateral operation,[1] by Sir Astley Cooper, which he gives in his Surgery (*q. v.*) would be a sufficient comment upon this remark of Lizars.

It is singular that so eminent and so well-informed a surgeon as he who collated the statistics which have furnished the bases for almost all comparisons in recent works on surgery in the English language, should have indicated an unconscious bias in this remark: "Maunde is said to have lost only 5 patients in 40 operations, and of 100 patients operated on by Frère Côsme, no more than 19 are reported to have died. These results are *so favourable that I have been unwilling to admit them* into the general estimate."[2]

The cases he calls Maunde's are not found in our tables, for we think there can be little doubt that the forty cases alluded to were those to which reference is made by Carpue in speaking of Berrier;[3] and have included no cases—*favourable or unfavourable*—of which there has appeared so little evidence. Côsme's, on the contrary, we have put in—that is, those given in his own book—as well as two more, of which there can be little doubt—because we find him precise above the habit of his time, and no less to be credited than any more recent author. There is sufficient evidence with regard to these cases to place them quite beyond question.[4]

As late as 1868, Mr. Holmes Coote, in a lecture upon "Lithotomy and Lithotrity," says, "I have not in these remarks adverted to the high operation. *In many cases it is impossible of performance*, and in none offers advantages such as I should have ever liked to avail myself of."[5]

Yet we have found, in the cases collected, only three in which the calculus was not removed. Mr. Coote is the only surgeon, so far as we know, who ever said the operation was "impossible of performance." The facts of the case do not seem to support such a statement at all.

These expressions are not solitary instances; although, to give force to what was stated before citing them, we have quoted the most striking that have been met. The ordinary dealing with this method in teaching has been such as to dissuade almost all surgeons from hazarding their reputations by trying what their superiors neither practised nor taught. Precedent, authority, and education have combined to prevent any adoption of the supra-pubic operation sufficiently general to permit its merits to be fairly judged. Under these circumstances no comparison based upon statistical results alone can be justly made. The study of the whole subject is surrounded with difficulties which few have penetrated, and probably few ever will care to penetrate. Still those few invariably have, and these we cannot but believe will, come to conclusions of its merits much more favourable than can be expected of those who get all their information at second hand.

---

[1] Sir Astley Cooper, "Principles and Practice of Surgery," 8vo., London, 1836, p. 383.

[2] G. M. Humphry, "Trans. of Provincial Med. and Surg. Association," vol. xvii., London, 1850, p. 103.

[3] J. C. Carpue, "A History of the High Operation for the Stone," 1 vol. 8vo., London, 1819, p. 121.

[4] G. B. Günther, "Der Hohe Steinschnitt," 8vo., Leipzig, 1851, p. 69.

[5] St. Batholomew's Hospital Reports, vol. iv., 1868, p. 137.

With these considerations in view, let us endeavour, as far as may be practicable, to compare the analyses of the statistics with those of other methods, and then proceed to examine the theoretical aspect of the subject.

Statistical Comparison.—The following figures in regard to the lateral operation are taken, with the exception of two tables (tables D and E), from the statistics of Keith in 1869,[1] as being sufficiently representative for this purpose.

TABLE A.[2]—*Showing the Age of Subjects of each Operation.*

LATERAL OPERATION.				SUPRA-PUBIC OPERATION.		
Age.	No. of cases.	Assumed Age of each.	Total.	No. of cases.	Assumed Age of each.	Total.
Under 21 . . .	1397	10	13,970	133	10	1330
21–40 . .	301	30	9,030	55	30	1650
40–60 . .	415	50	20,750	62	50	3100
Over 60 . . .	365	70	25,550	114	70	7980
	2478		69,300	364		14,060
Average age 28 years.				Average age 39 years.		

To show how much more advanced have been the ages at which the supra-pubic operation has been practised than those of the other method, we have taken all Keith's cases under 21 years as if they had been the mean between 1 and 20, that is, 10 years old; those between 21 and 40 I consider as 30; those between 41 and 60 I consider as 50; and those over 60 as 70. We have done the same in the cases in which the age is recorded in my own statistics, and the propriety of doing this is confirmed by the result; for the general average thus obtained varies only a fraction from that which is deduced from the sum of all the ages actually computed.

Thus we see that the average age in supra-pubic lithotomy has been more than a third greater than that of the perineal operation.

---

[1] Wm. Keith, "British Medical Journal," March 20, 1869, p. 253.

[2] The variation in the number of cases quoted in different tables is due to the accounts sometimes making no mention of certain phases, which in others are fully described.

TABLE B.—*Showing Results at Similar Periods of Life.*

	LATERAL OPERATION.				SUPRA-PUBIC OPERATION.			
Age.	No. of cases.	Recovered	Died.	Ratio of deaths.	No. of cases.	Recovered.	Died.	Ratio of deaths.
Under 21 .	1397	1274	123	1 : 11.35	133	105	28	1 : 4.75
21–40 .	301	256	45	1 : 6.68	55	34	21	1 : 2.62
41–60 .	415	322	93	1 : 4.46	62	47	15	1 : 4.13
Over 60 . .	365	248	117	1 : 3.11	114	75	39	1 : 2.92
	2478	2100	378	1 : 5.55	364	261	103	1 : 3.53

TABLE C.—*Showing Weight of Calculi in each Operation.*

	Recoveries.	Deaths.	In all cases.
Average weight in lateral operation	ʒ 5 .02	ʒ 16.03	ʒ 7.25
" " supra-pubic "	ʒ 25.44	ʒ 44.50	ʒ 32.00

This table shows that, in estimating the results of the supra-pubic operation, and comparing them with others, it must always be remembered they have been modified very greatly by the size and weight of the calculi, for whose removal it has been reserved. In the comparison made above, we find that of those cases which recovered from the supra-pubic operation, the calculi were more than five times as heavy as in the cases recovering after lateral lithotomy, of those dying the former exceeded the latter two and three quarters times; and of all cases the average in supra-pubic lithotomy has been four and a half times as heavy as that of the lateral operation.

TABLE D.—*Showing Mortality with Calculi of Same Weights.*

	LATERAL OPERATION.				SUPRA-PUBIC OPERATION.			
Weight.	Recovered.	Died.	Total.	Death ratio.	Recovered.	Died.	Total.	Death ratio.
Under ʒj .	482	47	529	1 : 11.25	11	3	14	1 : 4.66
ʒj–ij	101	18	119	1 : 6.61	17	4	21	1 . 5.25
ʒij–iij	19	16	35	1 : 2.18	10	4	14	1 : 3.50
ʒiij–iv	4	7	11	1 : 1.57	13	6	19	1 : 3.16
ʒiv–v	2	3	5	1 : 1.66	9	7	16	1 : 2.28
ʒv–vj	2	—	2	0 : 2.00	7	4	11	1 : 2.75
ʒvj–vij	—	2	2	1 : 1.00	1	1	2	1 : 2.00

The figures of the lateral operation in this table are taken from the Prize Essay of Crosse,[1] which is considered remarkably accurate.

In examining these death ratios, we find that, as soon as the weight of ʒij is passed, the results are very decidedly in favour of the supra-pubic operation. Of those between ʒj and ʒij there is little difference, while below ℥j the results of the lateral operation are much better than those of the other. It is proper to observe in regard to these small calculi, that the supra-pubic operation has been used for such in only 14 cases, while the lateral has been used in 529. This, in itself, is, we think, to be considered as unfavourable to a very good exhibit, and to be given some weight in the comparison. Beside this, the small calculi were removed in most cases from little children, to whom the supra-pubic operation was formerly very dangerous, because they struggled so violently against it. Since the introduction of anæsthetics, such a consideration would lose its force; but, as we find, the great majority of the recorded cases were done before they were used at all.

---

[1] John Green Crosse, "A Treatise on the Formation, Constituents, and Extraction of the Urinary Calculus," 1 vol. 4to., London, 1835, p. 163.

TABLE E.—*Showing the Average Number of Calculi.*

	No. of cases.	No. of calculi.	Average No. of calculi.
Recoveries	320	576	1.8 each
Deaths	132	746	5.6 "
Total	452	1322	3.— "

We have found no tables by which we can compare perineal and supra-pubic lithotomy in the matter of the number of calculi removed from each patient. In our special tables of statistics is one, giving the results when the numbers of calculi could be ascertained. In it it is assumed that there was only one calculus whenever it has not been stated that there were more. From it the following is drawn:—

TABLE F.—*Showing Mortality in Each Sex.*

	LATERAL OPERATION.				SUPRA-PUBIC OPERATION.			
Sex.	Cases.	Recoveries.	Deaths.	Death ratio.	Cases.	Recoveries.	Deaths.	Death ratio.
Male .	669	578	91	1 : 7.35	383	258	125	1 : 3.06
Female	35	33	2	1 : 17.50	82	72	10	1 : 8.20
Total .	704	611	93		465	330	135	
Ratio of all cases . . .				1 : 7.57	Ratio of all cases . .			1 : 3.44

The relation of sex to the result is shown in this table. The figures of the lateral operation are from Crosse's essay. In our own we have assumed every case to have been male, unless distinctly stated to have been female.

From this table we obtain also the comparison of the results of both methods, taking all the cases gathered, without exception. This gives us a ratio of deaths to operations of—by lateral lithotomy, 1 to 7.57; by supra-pubic lithotomy, 1 to 3.44.

To conclude this part of the subject, we shall present one more view of it.

TABLE G.—*Comparing Similar Phases.*

	Lateral Operation.	Supra-pubic Operation.
Average age of each patient . .	28 years.	39 years.
" Weight of each calculus .	ʒ 7.25	ʒ 32.00
" Mortality	1 : 7.57	1 : 3.43

Thus we discover that with an average age of the patients 11 years, or more than a third, greater, and an average weight of calculi 4½ times as great as those of the lateral operation, the general mortality is but little more than twice as great in the supra-pubic operation ; that it is but little greater in calculi over ℥j in weight, absolutely less in all over ℥ij, with all the disadvantages under which it has laboured.

With these facts before us, and recalling the considerations advanced in the beginning of our review, let us pass to the last division of it.

Theoretical Comparison.

This naturally divides itself into four parts :—

I. The approach to the interior of the bladder.
II. The conditions for seizing the calculus.
III. The facilities for extracting the calculus.
IV. The accidents which may follow the operation.

These we will examine in order.

I. *The Approach to the Interior of the Bladder.*—The structures divided in perineal lithotomy are very numerous and important. Beside the skin, fascia, and muscles of the part, it is filled with a vascular supply of considerable magnitude, and a great number of nerves and lymphatics. The nerves are of the most exquisite sensibility and important sympathetic connection, and the lymphatics are of considerable size and communicate immediately with the internal iliac glands. The vascular supply is of special importance. From the exterior to the cavity of the bladder, the arterial and venous trunks are numerous and large. These are the hemorrhoidal, perineal, and pudic arteries and veins, beside the artery of the bulb, the vessels of the prostate and prostatic plexus of veins. These furnish constant liability to hemorrhage, and there are many cases on record of fatal results from wounding them.[1] They also render a patient liable to an accident which is more apt to occur and quite as dangerous ; that is, the absorption of poisonous materials into the system. We cannot here quote authors to demonstrate the dangers of hemorrhage. There are few who have not recognized and acknowledged it ; but we will cite some remarks of Sir Wm. Fergusson[2] on this point. Presenting a specimen of a bladder with its vessels carefully injected, and calling attention to their multiplicity at the neck, he said: "The lithotomist may reflect as he looks on such a specimen as this. He may think of the bleedings he has seen; and if imbued with the views of some as to purulent and poisonous absorption and pyæmia, he may possibly imagine that he has fallen upon a good theory, if not a certain cause of death after lithotomy."

---

[1] For fuller details in regard to this, *vide* Jas. Spence, "Remarks on the Sources of Hemorrhage after Lithotomy," Liverpool and London Monthly Journal, March, 1841, p. 157 ; also Wm. Coulson, "Lithotomy and Lithotrity," London, 1853, 8vo., chap. xiii.

[2] Wm. Fergusson, "The Progress of Anatomy and Surgery," London, 1867, 1 vol. 8vo., p. 215.

In supra-pubic lithotomy there are encountered no nerves of any importance, very few lymphatics, and not a bloodvessel of the least significance. It is true that there are some cases in which hemorrhage is recorded as having occurred; but these were due to anomalous circumstances, as examination of them will disclose. It is extremely rare, as every anatomist knows, for any vessels large enough to give more than a trifling hemorrhage to be found in the track of the operator by this method.

The proximity of the rectum constitutes another peril of lateral lithotomy. There are a number of cases on record where it has been wounded, both by accident and by design, on account of the impossibility of extracting a calculus except thus. The consequences of this we shall see later. Of course such an accident could not occur in the supra-pubic operation, except by most inexcusable want of skill and care.

In perineal lithotomy it has not infrequently happened that the staff was missed or left by the knife of the surgeon, and the pelvic fascia opened. This is mentioned, among others, by Erichsen[1] who says: "Indeed, I believe that there is more danger of doing mischief in the withdrawal than in the entry of the knife; for, if it leave the staff for a moment, all guide is lost and the edge may sweep downwards through the base of the prostate and its investing capsule."[2] Of the danger of missing the urethra, he says: "It is, I believe, an inevitably fatal accident. . . . . I was present many years ago at the *post-mortem* examination of a fatal case of lithotomy, in which perhaps the most skilful operator of that day had opened the bladder beyond the prostate, leaving the urethra untouched. The patient died from the cause first stated."[3]

Beside these there is danger of opening the tissues between the rectum and the bladder. This has happened to a number of surgeons and has doubtless been the reason why some of them, after detecting calculi by sounding, failed to find them when they had, as they imagined, opened the bladder. To show that we do not overstate this liability, we will again quote Mr. Erichsen. "I have known this to occur in several instances to hospital surgeons of skill and experience, the forceps being passed into this space under the supposition of its being the bladder; and in every case the patient died unrelieved. . . . . In young children, lithotomy is from this cause always an anxious operation."[4]

---

[1] Surgery, vol. ii. p. 683.

[2] Op. cit., vol. ii. p. 690.

[3] Op. cit., vol. ii. p. 678.

[4] Op. cit., vol. ii. p. 683.

Supra-pubic lithotomy is not liable to any such danger; for in many cases the eye and in every case the finger can direct each step.

It seems almost superfluous to advert to the matter of wounding the peritoneum. Such an accident may, in rare cases, occur in perineal lithotomy from some of the errors in directing the knife; but it should never happen in supra-pubic lithotomy. The peritoneum lies only upon the posterior and superior surfaces of the bladder, and when this is distended there is a space of several inches from the level of the symphysis pubis to where the peritoneum is reflected upon the abdominal walls; and even if it were not so, it is very readily lifted from the bladder and kept out of the way during the operation. In *Holmes's Surgery* (iv. 467), it is stated that "the wounding of the peritoneum must be regarded as a failure in anatomical manipulation."

It is true there are in our statistics 13 cases where this did occur; but in several of them it might easily have been avoided; twice it was done intentionally; and in all cases except three, before the use of anæsthetics. This permits us to suppose struggles or convulsive movements sufficient to make such an accident quite possible; but the use of them entirely obviates this danger in our day.

It will be noticed that of the 13 cases referred to, 10 recovered; and it has been found by several operators that this accident is not nearly so much to be dreaded as might at first appear. In our day of so many operations in which the peritoneum must be cut, and whose results are so satisfactory, we can easily understand that this, occurring as an accident in supra-pubic lithotomy, need not be regarded as very dangerous. But, as has been remarked, there is no good reason why it should ever occur.

II. *The Conditions for Seizing the Calculus.*—In perineal lithotomy this may be rendered difficult by a number of circumstances. Such has been the experience not only of young surgeons but of some of the most skilful; and may be consequent upon the depth of the perineum or the shape or position of the calculus. In patients with very deep perinei, it is often quite impossible to reach a calculus with the finger, and the operator has to trust to sensations communicated very indirectly for guidance in this part of his work. A calculus may be flat and so be impossible to seize without great risk to the walls of the bladder itself. It may lie inaccessible behind an enlarged prostate, it may be adherent to the surface of the bladder, or contained in a cyst or a sac, which will not admit the blades of the forceps; or it may prove so large that the forceps cannot be made to grasp it, or so small that it eludes them entirely. Any one who has seen the lateral operation done at all frequently, must have noticed how often, in attempting to seize and withdraw a calculus, the forceps bring with them sometimes fragments of the calculus and parts of the mucous membrane of the bladder, and sometimes the latter without the former.

None of these difficulties complicate the supra-pubic operation. In whatever part of the bladder a calculus may be, it can be reached by the finger and usually seen, if necessary. With one finger in the rectum and one in the bladder, any but the most extraordinary calculus can be fixed at the will of the operator, it can be moved about, its axes can be changed so as to place it in the position most favourable to its extraction, and any instrument used has the immediate contact of the guiding finger to direct it. The operator need be in no haste, but may and should conduct deliberately and carefully, this as well as every other part of the operation.

III. *The Facilities for Extracting the Calculus.*—The extraction of a calculus is the step in lithotomy most fraught with danger to the patient. In his work on Practical Lithotomy and Lithotrity, Sir Henry Thompson[1] presents most forcibly this danger in case of calculi of any considerable magnitude. Erichsen says[2] a calculus two inches and upward in diameter can scarcely be removed by the ordinary lateral operation with any degree of force which it is safe to employ.

As a matter of fact it is probable that more patients die after lateral lithotomy in consequence of the violence done to the bladder and perineal tissues in attempts to seize and extract calculi, than from any or all other causes.

How dangerous are calculi of different sizes, may be judged from my table D, where it will be seen that in lateral lithotomy the mortality is more than five times as great in calculi weighing from ℥ij–℥iij as it is in those under ℥j. In supra-pubic lithotomy there is very little difference.

It might be said that large calculi are not often encountered in these times. This must not be too implicitly accepted; for, in the first place, many surgeons, especially in England, are choosing lithotrity for all calculi of small size, and the result of this must be to leave larger calculi alone to lithotomy, and writers upon this subject are already anticipating a higher rate of mortality in consequence of this. In the second place, large calculi are not so infrequent as might be supposed. In 1868 Augustus Brown[3] had a patient who died unrelieved of three calculi weighing respectively $\frac{3}{4}$ lb., less grs. xx; $\frac{1}{2}$ lb., less grs. xl; and grs. xl: total $1\frac{1}{4}$ pounds.

In 1874 we have reported two cases of bilateral lithotomy by Wm. May,[4] of Washington, in one of which the calculus weighed ℥viij, and in the operation (which had required "the whole strength of the operator"), was broken in half; only one-half was extracted, and the patient died in five days. At the post-mortem the soft parts were torn to remove the remaining half. His own opinion of this case was that the supra-pubic operation would have been impossible because the bladder could not be injected. It may be questioned, it appears to us, whether this patient's life was not sacrificed to the prevailing state of information in regard to supra-pubic lithotomy.

---

[1] Sir Henry Thompson, "Practical Lithotomy and Lithotrity," 1 vol. 8vo., London, 1871.

[2] Op. cit., vol. ii. p. 686.

[3] Transactions of the Pathological Society of London, vol. xix. p. 277.

[4] American Journ. of Med. Sciences, Oct. 1874, p. 442.

This same year we witnessed two operations through the perineum which terminated fatally. One was that of Dr. H. Lenox Hodge, at the Presbyterian Hospital in Philadelphia, where after vain attempts to extract or crush, continued for a very long time, he speedily and easily removed a calculus by supra-pubic operation; and the other, one of Dr. Harrison Allen, at the Philadelphia Hospital, in which he removed a large calculus after long protracted efforts.

It was the impression made upon our mind by these last two operations which led us to examine this subject, and the conviction has deepened as we have studied it, that a primary operation above the pubes would have offered to these patients a good chance of life, whereas the perineal certainly caused the death of one and probably of the other.

Examining the statistics, we find that calculi of ℥xxjss and ℥xxiij have been extracted successfully by the supra-pubic method, and that for calculi above ℥ij it has been more successful, in spite of all the adverse circumstances under which it has been used, than the lateral with all its advantages.

Before leaving this division of the comparison, we must speak of crushing a calculus *in situ*. This is a possibility in every method of lithotomy, but one full of danger. It inflicts so much violence upon the bladder and the wound, that Sir Henry Thompson declares it to be very undesirable, and Erichsen[1] says it "would probably be fatal to the patient." Rather than this he would advise doing the recto-vesical operation in addition to the one already attempted.

This procedure, then, seems so objectionable as not to be considered capable of introducing any favourable element to an operation which has not succeeded without it, and may be dismissed altogether.

IV. *The Accidents which may follow the Operation.*—Most of the fatal results of lithotomy are probably to be attributed, not to the method employed, but to the systemic condition of the patients. Still there are some special dangers to which certain methods expose a patient, which must be examined.

The only ones of consequence that have been urged against supra-pubic lithotomy are, peritonitis and urinary infiltration.

These have been asserted again and again to constitute the great objection to it. But we cannot find upon what grounds, except a general impression that it must be so. Many who by their voices have contributed to increase and perpetuate this impression cannot have been able to examine the subject carefully, and must have accepted and adopted too readily this view.

By referring to the statistics here gathered, it will be seen that there are in these 478 cases only 6 that died of peritonitis, and 7 of urinary infiltration. Some of these, too, had other affections sufficient to account for their death. On the other hand, it may be said that some must have died of these causes where it has not been so stated. This may be quite true, but in the absence of such statement it is not fair to base a comparison upon the assumption.

---

[1] Op. cit., vol. ii. p. 687.

The former of these accidents is recognized as following lateral lithotomy, as well as supra-pubic; and in both cases must result from some unfortunate step in the operation, and not attach as inseparable from its proper management.

The same is true of urinary infiltration. It ought not to occur. It is said that in supra-pubic lithotomy, we have not sufficient drainage of the bladder. But this seems to me to be an error. Unless there be some organic disease of the urethra, it will serve this purpose quite well. There are a number of cases on record, where patients withdrew their catheters, placed in the urethra for draining the bladder, immediately after the operation, and no evil resulted. Beside, there are not wanting surgeons who think that no fear need be entertained because for a while the urine passes out through the wound. Belmas says[1] that this danger is over-estimated, because purely theoretic, rarely observed, and now easily guarded against. Souberbielle[2] says it must be remarked that the passage of the urine by the wound is not painful at any period of the operation. There are also many cases on record that go to show how harmless this much-dreaded accident may be. Humphry, in giving his case of the supra-pubic operation, tells of another occasion, where by a false passage made there followed diffuse urinary infiltration of the scrotum and abdomen, from which the patient readily recovered. He comments upon it to indicate the same view as here expressed. Prof. Willard Parker, of New York, in 1854 did supra-pubic cystotomy in a case of rupture of the bladder and profuse urinary infiltration, and his patient made a good recovery.[3]

We could go on citing cases, but our only desire is to lead to a deliberate judgment upon this point, instead of the mere repetition of that opinion which has so long gone unchallenged.

On the other hand, there are dangers to which perineal lithotomy is liable, which cannot be charged against supra-pubic.

First, then, secondary hemorrhage may follow it; not a very common accident to be sure, but one that occurs frequently enough to deserve mention, and to which allusion has already been made.

Incontinence of urine, also. This is especially the case in women. Dudley considered it "alone an ample reason for preferring the high operation always in their case, when the calculus is very large and firm."[4]

---

[1] Op. cit., p. 301.

[2] Mém. de l'Académie, tome viii. p. 94.

[3] Transactions New York State Med. Soc., 1867, p. 345.

[4] Boston Med. and Surg. Journal, Oct. 19, 1836, p. 167.

Men, too, have been left, as recorded, with an incontinence scarcely less intolerable than the calculi from which they had been relieved.

Urinary fistulæ sometimes follow, instances of whose occurrence can be found scattered through the cases published.

Recto-vesical fistulæ are as likely to occur, and are much more to be dreaded. These constitute an affection almost as bad as the calculus. It is fortunate that they do not very often follow; but there is always a liability to them from the slightest deviation of the knife in the operation, or subsequent sloughing from bruising the tissues in extracting a large or rough calculus.

Finally, a danger which has of late been more thought of than ever before, is the serious sequence of impotence. It is impossible to estimate how often this supervenes upon lateral lithotomy; but doubtless it is much more common than is usually supposed. Attention was called to it as long ago as the time of Heister, who says[1] that patients operated upon by this method are often rendered impotent or partially so. A. K. Lindesay, of Calcutta, gives a case of impotence following the operation.[2]

Malgaigne has recorded two cases of impotence and incontinence,[3] coming under his own observation. Aston Key says he knew of one case.[4] A. Davidson, physician to the Queen of Madagascar, quotes Mr. Bryan, as saying: about 1840 he examined at every opportunity he had, the subjects operated upon for lectures, and every case had the prostrate divided and the vesiculi sliced into.[5] W. F. Teevan gives four cases where impotence unmistakably followed lateral lithotomy, and calls attention to the importance of considering the danger of it.[6]

Sir Henry Thompson, in 1871, used the following language:[7]—

> "But mark one essential difference between these two cases: one child has a large wound across very important parts; the other has none. Who shall say in that former case what is divided and what is not? The little prostate of such a baby is much more than cut through completely; but what of the seminal ducts, &c.? I have often thought I should like to know the subsequent condition in adult life of twenty patients cut for stone in infancy; and to ascertain what, if any, injurious effects resulted to those organs recognizable at that period of life."

Dr. Wm. G. Porter has informed us of a case where a man who had had children by a former wife, upon marrying again, after being subjected to the lateral operation of lithotomy, had no more children.

This particular accident may well be made the subject of special investigation; but in this place it is only possible to call attention to it and give these cases already collected. It seems scarcely necessary to say that supra-pubic lithotomy could not be followed by such results.

---

[1] *D. Laurentii Heisteri*, "Institutiones Chirurgicæ" 2 vols., 4to., Amsteladami, 1747. ii. 5, cxlii.

[2] Transactions Med. and Physical Soc. of Calcutta, vol. v. 1831, p 268.

[3] Journ. de Médecine, Chirurgie et Pharmacologie, tome xx., Paris, 1855, p. 548.

[4] Guy's Hospital Reports, vol. ii. 1837, p. 26.

[5] Edinburgh Med. Journ., May, 1873, p. 1057.

[6] Transactions of Clinical Soc. of London, vol. vii. 1874, p. 179.

[7] Lancet, Oct. 1871, p. 512, American reprint.

It will be naturally asked, then, what have been the causes of death after operations by this method? and what relation does it bear to them?

In seeking a solution to this question, we have examined all those cases where it was possible actually or probably to ascertain the cause. These have also been arranged in two tables, one containing such as seem to have resulted from sequelæ common to all methods of lithotomy, and the other, those which appear to have been due to the method itself, as distinguished from others.

In the carrying out of this plan there may be some error; but we have endeavoured to put each case where it properly belongs, so as to make a fair presentation of the matter.

TABLE I.—*Deaths attributable to the Method.*

Failure to remove calculus	3	Peritonitis	6
Hemorrhage	2	Pelvic abscess	1
Iliac abscess	1	"Terrible operation"	1
Peritoneum cut or burst	3	Urinary infiltration	7
" detached	1	Total	25

TABLE II.—*Deaths not attributable to the Method.*

Atheroma and fatty heart	1	Nephritis	2
Abscess into stomach	1	Not determinable	21
Carcinoma of bladder	2	Perineal operation complicating	12
Congestion of brain	1	Phlebitis	1
Convulsions	1	Phthisis	1
Cystitis	2	Pneumonia	2
Diarrhœa	2	Previous very bad condition	11
Diphtheria	1	Pyelitis and suppurative nephritis	18
Effusion into brain	1	Pyemia	4
Emesis and inanition	1	Renal calculus	3
" from chloroform	1	Stated as not due to operation	1
Feebleness	1	Tuberculosis	1
Gangrene of lung	1	Typhoid fever	1
Gastritis	3	Uræmia	1
Heart clot	2	Worms	1
Indiscretions of patient	5	Unjustifiable procedures in operating	2
Meteorism	2	Total	110

In summing up this part of our subject, we conclude that there are two dangers to which all methods of lithotomy are liable, viz.: peritonitis and urinary infiltration, but that, so far as statistics discover, these are no more to be feared in the supra-pubic than in any other method. Beyond this, if our conclusions thus far have been just, we have a number of hazards connected with perineal lithotomy to which supra-pubic is not at all open; these are hemorrhage, incontinence of urine, perineal fistulæ, recto-vesical fistulæ, and impotence.

If these, then, be the facts, is not this method deserving of more attention and a fairer trial than it has yet had? Does it not, theoretically and by its actual results, commend itself to the candid judgment as a method which offers sufficient probability of success, if rightly and carefully executed, to lead to its application in other cases than the most desperate? For many years it has been assigned this position of a "forlorn hope." Shall it not be some day placed where, with less disastrous obstacles, it may win success without having its victories made to seem like defeats because of the losses rendered inevitable by the field to which it has been limited?

One thing is reassuring to him who studies the subject. Every one who has done this with much thoroughness, who has examined fully the literature of it, presently ranges himself upon the side of its defenders. Günther, who collected 260 cases, and prepared the most complete work upon the subject yet published, says, "were the operation more practised, it would be more esteemed;" and it seems that were there more known about it, it would have a place at least equal to that of lateral lithotomy.

The Method of performing Supra-pubic Lithotomy.—Preparatory treatment should be conducted upon general principles.

During the operation the surgeon should constantly bear in mind that *safety is more to be desired than speed,* and each step should be carefully and deliberately accomplished.

Previous to the operation the pubes of the patient should be shaved, and the skin of the hypogastrium and groins anointed with some simple ointment to protect them from excoriation by any fluid that may come from the bladder. The urine should be all drawn off, and, if possible, the bladder washed out, by means of a double catheter, with warm water, to which some antiseptic has been added. The patient should then be placed upon a table, of height convenient for the surgeon, with a pillow under his buttocks and loins, so as to raise them a few inches, in order to cause the mass of intestines to gravitate toward the upper part of the abdominal cavity.

While the incision of the skin is made, the legs may be held forcibly extended over the edge of the table, each by one assistant, so as to make the hypogastrium tense. They may be separated so that the surgeon may stand between them, or this may be omitted at discretion, if he prefer to place himself at the side of the patient. As soon as the skin and superficial fascia are divided to an extent of three inches in a line vertical to the symphysis pubis, the legs should be elevated and flexed upon the thighs, and these upon the abdomen, so as to place the patient's heels against his buttocks, and relax the abdominal muscles, permitting the intestines more freedom to leave the pelvis, and the breathing to become more costal. The knees should now be held pretty widely separated, while the surgeon carefully *dissects* through any fat he may encounter, and exposes the linea alba and pyramidalis muscle. These are to be divided upon a director, so as not to involve any other structures. If the calculus be large it may be well to make a slight transverse nick in each rectus muscle at a point one and a half inches above the symphysis to avoid danger of subsequent hernia. This should not be done unless absolutely necessary. After this the transversalis fascia is to be divided very carefully, and the bladder will be exposed.

If at any time the peritoneum be met, it must be gently pushed upwards, and held out of the way by an assistant. If due care be used it is hardly possible that it will be wounded.

When the bladder is exposed, it will be found collapsed in the pelvis, and at this point a careful and deliberate injection with warm, and, I think, preferably mucilaginous, water, to which some antiseptic has been added, should be made through the urethra. The amount of this must be regulated by the eye or finger of the surgeon, who should judge when it has been carried far enough for his purpose, and not subject the bladder to any needless strain. If the bladder can be distended so as to offer a sufficient surface to the knife it will so much the more facilitate the rest of the operation. If this cannot be done a sound may be passed per urethram, and made to lift its anterior wall up behind the pubes. (It does not appear that the sonde-à-dard offers any advantage over this method.)

In either of the cases supposed, the next step should be to hook the top of the anterior bladder wall firmly up with a strong tenaculum, of the breaking of which there should be no danger, and have it held by an assistant.

When the bladder is thus steadied, the surgeon should—if the injection have been effected—thrust a straight bistoury into its cavity just below the line of the tenaculum, and carry it down, if possible by simple pressure, almost to the symphysis pubis. The line of the thrust should be in the direction of the axis of the pelvis, so as not to transfix both sides of the bladder. If the sound have been used to raise the bladder, the surgeon may more leisurely execute this opening of its cavity.

When this is done the surgeon must be careful that, in his haste to pass his finger into the bladder, he do not tear it from any of its connections. The finger should be gently insinuated into the cavity and explore it. If the calculus be small, it alone may be able to effect the extraction, or it may be aided by another, or the thumb, or the forceps may be introduced and remove the calculus. The fingers in the bladder may, if necessary, be seconded by one or two in the rectum in placing the calculus in the direction most conducive to its safe extraction. This should be done very gently. No force should be exerted, and if any parts do not readily pass through the wound it is much better to nick its edges than to violently drag the calculus through.

This being effected, the interior of the bladder should be carefully explored with the finger, and, if any fragments be found, they should be removed, and the cavity washed out with a syringe.

Afterward, we think, the results of some of the German surgeons indicate that the best plan is to sew *the bladder* up tight. The Lembert suture, as used for wounded intestines, seems to answer the purpose best by bringing together two freshly cut surfaces, with some tissue between where the silk is placed and the unhealthy mucous membrane. If this suture cannot be applied, any that is used should if possible bring together two external surfaces of the bladder.

We have been led to believe, also, that it is best not to sew up the wound in the abdominal walls. This may in some cases delay union of them a little longer; but would also give a greater security against any burrowing of pus that might occur if it had not free exit. This external wound should be simply dressed; a little lint saturated with carbolized oil may be laid upon it and loosely secured, the treatment being directed to absorb any discharges and allay irritation. No force should be exerted, only such gentle control as may keep it from slipping from its place. The aim should be to keep the wound in the bladder firmly closed, and make the rest of the incisions act like simple incised wounds.

With this the operation is complete. The anæsthesia being suspended, the patient should be placed in bed in a *semi-sitting posture.*[1] By this the weight of the intestines will press the contents of the pelvis and the wounded tissues firmly together, and tend to prevent any infiltration or burrowing of pus.

If after the operation the urine of the patient pass freely by the urethra, the subsequent treatment is to be conducted upon general principles. If it do not, the cathether must be used often enough to prevent any considerable distension of the bladder, or strain upon the sutures in its wall. And a watch must be kept that the vesical orifice of the urethra do not become occluded by pus, or blood, or gravel. Washing out with a double catheter will overcome this if it occurs. If the healing go on without accident, the sutures will come out through the external wound, which itself will heal by gentle suppuration and granulation, and the wound of the bladder will become consolidated with the external wound. This has been observed in a number of cases by post-mortem examination, and never has caused any trouble. If a subsequent operation should ever be needed for another calculus, it renders the second operation very simple and devoid of danger. This too is attested by experience.

In concluding the review of our subject, we will give, as a contribution to its literature, a table of 42 cases, operated upon by American surgeons, by this method. They are selected from the entire number collated, and are believed to include nearly all that have ever been done in this country. They have been gathered from many journals and surgeries, and also by correspondence, and will, we trust, be of sufficient interest to warrant their early publication.

---

[1] This plan has succeeded well in some cases of Côsme, and of Robertson, of San Andreas, California.

No.	Surgeon.	Date.	Age of patient.	Sex.	Size or weight of calculus.	Recovered.	Died.	Time after operation in days.	Reference.	Remarks.
1	Gibson,	1824	old	M.	2 calculi	..	D.	....	Gibson's Surgery, 1835	Was doing very well, but withdrew his catheter, and peritonitis set in.
2	Carpenter,	1827	8	M.	2 "	R.	..	....	Am. Med. Rec., No. 39, 1827, p. 199; Eclectic Journ. of Medicine, vol. ii, May, 1838, p. 288	
3	McClellan,	..	..	..	......	R.	..	....	Gross, Diseases of Urinary Organs, p. 632.	
4	"	..	..	..	......	R.	..	....	" "	
5	"	..	..	..	......	R	..	....	" "	
6	"	..	..	..	......	..	D.	....	" "	Constitution very much shattered by previous disease.
7	"	..	..	..	......	..	..	....	" "	
8	Gardner,	1844	42	M.	℥ixss	R.	..	....	Gross, Kentucky Surgery, p. 105; Letter of Gardner, Feb. 16, 1875	Immediately after *failure of perineal operation.*
9	W. L. Atlee,	1848	man	M.	circumference 4″	R.	..	....	Eve, Remarkable Cases in Surgery	*Lateral operation had failed* six months before.
10	DeValetti,	1849	"	M.	℥iv	R.	..	38	New Orleans Med. and Surg. Journ. Sept. 1849, p 176	Calculus 18 years.
11	Delery,	1850	12	M.	ʒix	R.	..	30	L'Union Médicale de Louisiana, No. 3, March, 1852, p. 46	Applied sulph. of iron & camphor to prevent urinary infiltration.
12	Pope,	1850	22	M.	℥iij ʒvss, & as much more	..	D.	3	St. Louis Med. and Surgical Journal, Sept. & Oct 1864	*Did perineal operation also*, and tunnelled through and through the calculus.
13	W. J. Johnson	1851	18	M.	℥vj	..	D.	4	Southern Med. Jul., Dec. 1851, p. 727	*Perineal operation had failed*, and also a great many ineffectual attempts to crush.
14	Parker,	1853	53	F.	2″ × 1½″	R.	..	....	N. Y. Med. Journ., Mar. 1855, p. 252	
15	"	.853	53	F.	......	R.	..	....	" "	
16	"	1854	47	F.	......	R.	..	....	" "	
17	"	1855	62	F.	......	R.	..	....	Letter of Dr. Parker, Sept. 21, '74	
18	"	1857	53	M.	......	..	D.	4	" " and also Amer. Med. Times, July 7, 1860	Died of emesis from inflammation of stomach.
19	Pitcher,	1854	8	F.	℥iij	R.	..	..	Letter of Dr. S. H. Douglas, Oct. 5, 1874	
20	Eve,	1855	66	M.	℥j ʒij	R.	..	18	Trans. Am. Med. Assoc'n '71, vol. xxii. p. 273	
21	"	1858	28	M.	℥iv ʒij	..	D.	3	" "	Peritonitis.
22	Weber,	1856	4	F.	......	R.	..	12	N. Y. Med. Journ. July, 1856, p. 45	
23	Noeggerath,	1857	8	M.	ʒij	R.	..	25	N. Y. Med Journ. January, '58, p. 9	
24	Hewitt,	1859	19	M	......	R.	..	21	N Y. Med Journ. March, 1859, p 217	
25	Krackowizer,	1859	1½	M.	......	..	D.	1	Am. Med. Times, July 7, 1860	Died of emesis from chloroform
26	"	1860	3	M.	......	..	D.	..	" "	Died of pneumonia.
27	"	..	boy	M.	......	..	D.	2	" "	
28	"	..	"	M.	......	..	D.	..	Letter of Dr K., Sept. 23, 1874	
29	"	..	"	M.	......	R.	..	..	" "	
30	"	..	"	M.	......	R.	..	..	" "	

No.	Surgeon.	Date.	Age of patient.	Sex.	Size or weight of calculus.	Recovered.	Died.	Time after operation in days.	Reference.	Remarks.
31	Wood,	1860	58	M.	pigeon's egg	..	D.	2	Am. Med. Times, July 7, 1860	*Peritoneum cut* in two places.
32	Felton,	1862	..	M.	......	..	D.	1	Nashville Journ. Med. and Surg, Jan. 1867, p. 502	To remove a shrapnel shot.
33	Mackenzie,	..	2½	..	......	R.	..	....	Letter from Dr. M., Aug 29, 1874	
34	Westmorel'nd	1863	7	F.	......	R.	..	....	Letter from Dr. C. H. Mastin, Jan'y 1, 1875	
35	Robertson,	1865	56	M.	℥j ʒvj	R.	..	35	Pacific Med. & Surg Journ. April, '68, p. 499	Placed in semi-sitting posture for 48 hours after operation
36	Guido Bell,	1867	4½	M.	grs. xvj	R.	..	26	Memorabilien, Heilbronn, Mar. 28, 1874, p. 552	Bladder sewed up; catheter pulled out same even'g.
37	"	1872	3	M.	ʒjss	R.	..	21	" "	*Peritoneum cut*, but no harm resulted.
38	Bock,	1873	6	M.	ʒj	R.	..	21	Letter of Dr. B., Sept. 10, 1874	
39	"	1874	3	M.	......	R.	..	....	Letter of Dr. B., Dec. 8, 1874	
40	H. Lenox Hodge,	1874	52	M.	℥ijss	..	D.	2	C. W. D.	Immediately after *failure of perineal operation.*
41	Edw'd Geddings,	1866	8	M.	2½ long	..	D.	10	Letter of Dr. G., May 15, 1875	
42	Bailey,	1874	2½	..	54 grs.	R.	..	25	Letter of Dr. B. May 28, 1875	
43	Eli Geddings,	1844	40	M	......	R.	..	....	Letter from Dr. G, May 13, 1875	

Recovered	28
Died	14
Not stated	1
Total,	43

ART. IV.—*Lesions of the Optic Nerve and Pupil in Connection with Certain Affections of the Spinal Cord, with Special Reference to Pott's Disease.*

By CHARLES S. BULL, M.D., Ophthalmic Surgeon to Charity Hospital; Assistant-Surgeon New York Eye and Ear Infirmary; Microscopist to Manhattan Eye and Ear Hospital.

WITHIN the past ten or fifteen years, many observers, in Europe and this country, have devoted much time to examining the eyes of patients affected with lesions of the nerve-centres, and much has been written upon the intraocular manifestations of such diseases. The ophthalmoscope has been extolled for what its ultra admirers have called the "wonderful, almost marvellous, utility which science has thus conferred upon the ophthalmologist." But a zeal, admirable in the beginning, has gone too far, and an unbounded admiration, unchecked by sound judgment, has brought the